1) (15%) The partial specific volume ($\bar{v}$) of a DNA molecule was measured and found to be 0.50 ml/g in 150 mM NaCl. After dialyzing the molecule against a low salt buffer (1 mM NaCl), the $\bar{v}$ increased to 0.55 ml/g. Explain why the molecule has an increased $\bar{v}$ in low salt – what is happening to the molecule in low salt?

2) (15%) In going from high salt to low salt, would the anhydrous DNA molecular weight increase, decrease or stay the same? Explain your answer.

3) (15%) In going from high salt to low salt, would the sedimentation coefficient increase or decrease or stay the same? Explain your answer.

4) (15%) In going from high salt to low salt, would its diffusion coefficient increase or decrease or stay the same? Explain your answer. Hint: $D=RT/(Nf)$, where D is the diffusion coefficient, R is the universal gas constant, T is the temperature, N is Avogadro's number, and f is the frictional coefficient.

5) (15%) Compared to a sedimentation speed in a velocity experiment performed at 40,000 rpm, the same sample measured at 20,000 rpm will sediment... (write down the equation for the relevant force term)

a) twice as fast
b) four times as fast
c) half as fast
d) a quarter as fast
e) the same
f) it will float

Equation:_____

6) (25%) For the reaction A + B <=> AB calculate the molar concentration of [B] that must be ***added*** to the reaction to achieve 30% binding of A at equilibrium if the Kd is 500 nM and you start with 300 nM [A] (total) in the mixture. Also calculate the amount of [B] that remains unbound at equilibrium.